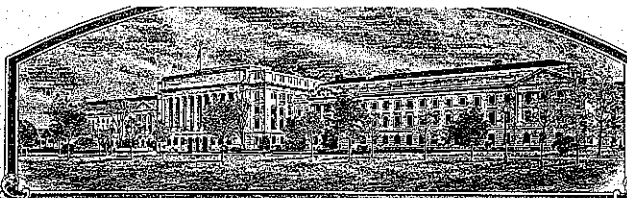


No.

200100112



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Coors Brewing Company

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE VARIETY. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Moravian 37'



Attest:

*[Signature]*

Acting Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*In Testimony Whereof, I have herunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirteenth day of November, in the year two thousand two.*

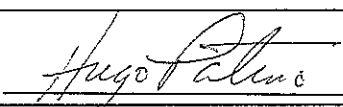
*[Signature]*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

**APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE**  
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER Coors Brewing Company		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME C37		3. VARIETY NAME Moravian 37	
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) 12th and Ford Street Golden, Colorado 80401 United States of America		5. TELEPHONE (include area code) (303) 279-6565		FOR OFFICIAL USE ONLY PVPO NUMBER <b>200100112</b> FILING DATE <b>2-15-2001</b>	
		6. FAX (include area code) (303) 277-6426			
7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) Corporation		8. IF INCORPORATED, GIVE STATE OF INCORPORATION Colorado		9. DATE OF INCORPORATION June 12, 1913	
10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. (First person listed will receive all papers) Jay K. Malkin KLAAS, LAW, O'MEARA & MALKIN, P.C. 1999 Broadway, Suite 2225 Denver, Colorado 80202 United States of America				FILING AND EXAMINATION FEES: \$ 2705.00 DATE 2-15-2001 CERTIFICATION FEE: \$ 320.00 DATE 2/4/02	
11. TELEPHONE (Include area code) (303) 298-9888		12. FAX (Include area code) (303) 297-2266		13. E-MAIL KLAASLAW@ATT.NET	
				14. CROP KIND (Common Name) 2-Row Spring Malting Barley	
18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse) a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of Variety d. <input type="checkbox"/> Exhibit D. Additional Description of the Variety (Optional) e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Owner's Ownership f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,705), made payable to "Treasurer of the United States" (Mail to the Plant Variety Protection Office)				19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act <input checked="" type="checkbox"/> YES (If "yes", answer items 20 and 21 below) <input type="checkbox"/> NO (If "no," go to item 22)	
				20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? IF YES, WHICH CLASSES? <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
				21. DOES THE OWNER SPECIFY THAT THE CLASSES BE LIMITED AS TO NUMBER OF GENERATIONS? IF YES, SPECIFY THE NUMBER 1, 2, 3, etc. <input type="checkbox"/> FOUNDATION <input type="checkbox"/> REGISTERED <input type="checkbox"/> CERTIFIED	
				(If additional explanation is necessary, please use the space indicated on the reverse.)	
22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (Please use space indicated on reverse.)				23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (Please use space indicated on reverse.)	
24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate. The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act. Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.					
SIGNATURE OF OWNER Coors Brewing Company 			SIGNATURE OF OWNER		
NAME (Please print or type) Hugo Patino			NAME (Please print or type)		
CAPACITY OR TITLE Vice President - Quality, Research & Development		DATE Feb. 13, 2001		CAPACITY OR TITLE	
				DATE	

**GENERAL:** To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable (*in the sense that it will reproduce an entire plant*) tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for \$2,705 (\$320 filing fee and \$2,385 examination fee), payable to "Treasurer of the United States" (*See Section 97.6 of the Regulations and Rules of Practice.*) Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfilled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of \$320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

**Plant Variety Protection Office**

Telephone: (301) 504-5518

FAX: (301) 504-5291

Homepage: <http://www.ams.usda.gov/science/pvp.htm>

**ITEM**

- 18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) evidence of uniformity and stability; and (4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified
- 18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
- (1) identify these varieties and state all differences objectively;
- (2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
- (3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.
- 18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.
- 18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.
- 18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.
19. If "Yes" is specified (*seed of this variety be sold by variety name only, as a class of certified seed*), the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. (*See Regulations and Rules of Practice, Section 97.103.*)
21. See Section 83 of the Act for the Contents and Term of Plant Variety Protection.
22. See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.
23. See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.

**21. CONTINUED FROM FRONT** (Please provide a statement as to the limitation and sequence of generations that may be certified.)

**22. CONTINUED FROM FRONT** (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.) Please note that none of the activities listed in Exhibits A and B were done to exploit the subject variety but were instead exclusively done for testing, experimentation, and/or increase purposes as per 7 USC 2401(b). Likewise, on 2/16/00, a transfer/sale of seed produced by the variety occurred from Applicant to one of its contract growers in N. Colorado which was also exclusively done for testing, experimentation, and/or increase purposes as per 7 USC 2401(b) and was not done to exploit the variety.

**23. CONTINUED FROM FRONT** (Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)

**NOTES:** It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. (*See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.*)

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number for this collection of information is (0581-0055). The time required to complete this information collection is estimated to average 1.4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

S&T-470 (9-00) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (6-98) which is obsolete.

EXHIBIT AORIGIN AND BREEDING HISTORY OF VARIETY MORAVIAN 371. **GENEALOGY/BREEDING PEDIGREE:**

(A) Cross breeding and selection of the claimed variety (previously identified by temporary experimental number "C37" but now designated hereinafter as "Moravian 37" which shall be considered the final variety name thereof) was performed by Berry J. Treat, David J. Gebhardt, Kathy R. Adams, Roy J. Hanson, James M. Jakicic, and Dennis J. Dolan beginning with parental barley plantings in the fall of 1991 at the Coors Brewing Company Malting Barley Research Center, Burley ID (USA).

(B) The origin of Moravian 37 is as follows:

- i. Crystal [female] was crossed with CH35-3-7 [male] (e.g. Crystal [female] x CH35-3-7 [male]) to yield a further product designated herein for informational purposes as "DH85-15".
- ii. The product of the cross set forth above in breeding sequence [i] (e.g. DH85-15) was then crossed (as a female) with Galena [male] to yield a further product designated herein for informational purposes as "AC88-44-8".
- iii. The product of the cross set forth above in breeding sequence [ii] (e.g. AC88-44-8) was then crossed (as a female) with Cheri [male].

In summary, the entire breeding sequence is as follows:

"Crystal/CH35-3-7//Galena///Cheri" or (expressed in a more short-hand form), "AC88-44-8///Cheri"

Likewise, the above-listed sequence can be expressed in a still further manner, namely:

"((Crystal x CH35-3-7 [DH85-15]) x Galena) [AC88-44-8] x Cheri".

This cross product was given the experimental name of "C92-350" (which was later named "C37" or "Moravian 37").

(C) Background information regarding the above-listed parental varieties is as follows:

- i. Crystal - This variety was developed by the USDA/ARS, Aberdeen, ID (USA) by Dr. D. Wesenberg. It was specifically obtained from the cross [Columbo/Klages] and was designated as "78AB6871" prior to release as Crystal.
- ii. CH35-3-7 - The Plant Breeding Institute developed this chemically-mutated dwarf selection line from Maris Mink.
- iii. Cheri - Original seed was obtained from the breeders at Schwieger & Company, West Germany. It was specifically obtained from the cross [Triumph//Medusa/Diamont], with Cheri previously being characterized as an experimental line designated as "78W560".
- iv. Galena - Triumph/Crystal

## 2. DETAILS OF SUBSEQUENT STAGES OF SELECTION AND MULTIPLICATION

- (A) The basic cross listed above (e.g. [Crystal/CH35-3-7//Galena//Cheri] or [AC88-44-8//Cheri] as previously stated) was undertaken by the Coors Brewing Company in a greenhouse located in Burley, ID (USA) during the late fall of 1991 extending into 1992.

- (B) F1 seeds from the above-listed basic cross (designated as "92-50") were harvested and increased by planting in the greenhouse at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA) during the winter/spring of 1992.
- (C) F2 bulked seeds were then planted in the field at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA) in spring of 1992 for segregating plant selection. The plants selected were single head selected and harvested.
- (D) F3 and F4 single plants were grown in a single seed decent method in the greenhouse at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA) during the fall/winter of 1992. The F4 plants were single head selected and harvested.
- (E) F5 head rows were planted in the field at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA) in the spring of 1993. Superior rows were identified and head selections were made at harvest.
- (F) F6 individual head selections were increased in a three (3)-meter row in New Zealand during the winter of 1993-94. The row was bulk harvested as pure seed.
- (G) F7 Observation trial plots were planted at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA) during the summer of 1994. The line was identified as superior and renamed "C92-350". C92-350 was selected for advancement based on its expression of superior agronomic and malting characteristics, as well as high yield and very large plump seed.
- (H) F8 C92-350 was planted in replicated/multiple location yield trials in the spring/summer of 1995 at the Coors Brewing Company Malting Barley Research

Station in Burley, ID (USA) and at other locations in the USA. Based on agronomic and malting quality test data, C92-350 was chosen for advanced breeder seed development. At harvest (F9) multiple head selections were taken for subsequent breeders seed head rows.

- (I) F9 head selections were increased in New Zealand during the winter of 1995-96.
- (J) F10 breeders seed was planted in the summer of 1996 at the Coors Brewing Company Malting Barley Research Station in Burley, ID (USA). At that time, C92-350 was renamed and given the experimental designation "Coors 37" or simply "C37".
- (K) F11 Foundation seed of C37 (FND#97BUR-7) was increased in 1997 at the Coors Brewing Company Malting Barley Research Center in Burley, ID (USA). The variety (e.g. C37) passed pilot-scale malt and brew testing by the Coors Brewing Company at its main facility in Golden, CO (USA) in 1998. Thereafter, C37 entered large production scale seed increase and subsequent malting and brewing tests at the Coors Brewing Company main facility in Golden, CO (USA) during 1999-2000. In 2000, C37 was renamed "Moravian 37".

### 3. EVIDENCE OF UNIFORMITY AND STABILITY:

Field scale acreage of Moravian 37 (for production testing and/or seed increase) has been grown since 1997. No variants have been detected/observed, and the variety is uniform and stable. This uniformity and stability have been observed over six (6) generations. In past conversations between Applicant's representative(s) and Dr. Alan A. Atchley of the PVPO (including a discussion between Dr. Atchley and Dennis J. Dolan [a Breeder employed at that time by Applicant] which took

place on or about 4/27/98), it was indicated that a recitation of the type listed above would be sufficient to satisfy all requirements involving this Exhibit as it related to stability and uniformity.

4. **TYPE AND FREQUENCY OF VARIANTS OBTAINED DURING REPRODUCTION/MULTIPLICATION:**

As noted above, no variants have been detected/observed, and the variety is uniform and stable.

5. **SELECTION CRITERIA:**

To assist in the examination and assessment of this application, specific information will now be provided regarding the selection criteria associated with Moravian 37. Such criteria were generally based on agronomic and malting-brewing performance, with the specific selection criteria of concern being as follows: (1) high grain yield; (2) plant height; (3) lodging resistance; (4) disease resistance; (5) plant phenotype; (6) kernel discoloration; (7) test weight; (8) plump kernels; (9) low protein; (10) early maturity; (11) malting quality; and (12) beer flavor. Regarding malting and brewing characteristics, at least twenty-five individual factors are observed and characterized. Additional information concerning the breeding of Moravian 37 is provided above in this Exhibit.



EXHIBIT B - STATEMENT OF DISTINCTNESS

On or about 6/14/96, Dennis J. Dolan (then a Breeder employed by Applicant) spoke with Dr. Alan A. Atchley of the Plant Variety Protection Office ("PVPO") regarding the submission of protein profile information (e.g. of the type provided below which involves protein banding/staining) as evidence of distinctness in connection with this Exhibit and the statutory requirements of the Plant Variety Protection Act ("PVPA"). During this conversation, Mr. Dolan received approval for this approach in satisfaction of the requirements listed above. Likewise, in a separate conference between Applicant's legal counsel (Jay K. Malkin) and Dr. Atchley which took place on or about 5/1/00, it was confirmed that protein profile data of the type provided below (namely, involving protein banding/staining) was acceptable to distinguish a claimed variety from others. Accordingly, detailed protein profile data (which provides clear and convincing evidence of distinctness in this case) will be presented along with other relevant information.

As noted in Exhibit C which accompanies the current application, it is hereby indicated and confirmed that the varieties which are most similar to and/or most closely resemble the subject variety ("C37" also known as "Moravian 37") taking all relevant factors into account including physical characteristics and the like are (1) "**Cheri**"; and (2) "**Galena**" (which is the subject of Plant Variety Certificate No. 8900268 issued on 3/31/93, with this variety also being owned by Applicant Coors Brewing Company).

**A. Iso-Electric Focusing**

Iso-Electric Focusing (hereinafter called "IEF") and staining of hordein proteins was used to clearly distinguish Moravian 37 from Cheri and Galena (which, as noted above) are most similar to and/or most closely resemble Moravian 37. The term "hordein" involves a particular type of protein found in the endosperm of, for example, barley and other plants. Hordein protein profiles are distinctive from one plant variety to another and are therefore an excellent indicator of varietal distinctness.

The four (4) varieties that were tested, as well as Moravian 37, are listed below in TABLE I along with their pedigree. While Cheri and Galena are most similar to and/or most closely resemble Moravian 37 taking all relevant factors into consideration, protein banding/staining data is likewise provided in connection with CH35-3-7 and Crystal which are the other parents of Moravian 37 (aside from Cheri and Galena). The analytical procedures associated with the IEF tests outlined in this Exhibit were undertaken by STA Laboratories, Inc of 630 S. Sunset Street, Longmont, CO (USA) 80502; Telephone: 800-426-9124; Fax: 303-772-4003; Internet: [www.stalabs.com](http://www.stalabs.com), with additional information regarding these procedures being presented/discussed below.

**TABLE I**

Sample	Cultivar	Description	Pedigree (See Ex. A)
A	Moravian 37	New Variety	AC88-44-8///Cheri
P1	Cheri	Parent	Triumph//Medusa/Diamont
P2	Galena	Parent	Triumph/Crystal
P3	CH35-3-7	Parent	Maris Mink
P4	Crystal	Parent	Columbo/Klages

As noted above, the IEF testing procedures involving the barley varieties of interest were undertaken at the direction of the Coors Brewing Company (Applicant) by STA Laboratories, Inc. of Longmont, CO (USA). Included as Attachment B-1 is the specific test protocol that was employed in implementing the IEF tests/procedures. The tests/procedures were conducted during August-October of 2000 as verified by the Certificate of Analysis included as Attachment B-2. It should be noted that information in Attachments B-1 and B-2 which related to another barley variety that is not the subject of the current application has been removed therefrom.

### Discussion of Test Results:

Provided with this Exhibit as Attachment B-3 is an actual original gel film showing the protein banding patterns associated with all of the samples (e.g. barley varieties) listed above (including Moravian 37), with such bands being identified using alphabet letters "A" through "F". Also provided are (1) Attachment B-4 which involves a labelled photocopy of the gel film of Attachment B-3 wherein the various banding patterns associated with letters "A" through "F" are clearly labelled using lines drawn through the image; and (2) Attachment B-5 which is similar to Attachment B-4, but is enlarged (relative to Attachment B-4) and does not include the lines drawn therethrough. Each complete banding pattern in the gel film of Attachment B-3 is labelled at the top thereof with code-designator/indicia "A", "P1", "P2", "P3", and "P4" corresponding to the sample numbers presented in TABLE I and TABLE II (below).

TABLE II specifically contains a protein band characterization of each barley variety listed in TABLE I. In TABLE II (which involves the presence or absence of particular hordein proteins as characterized by iso-electric focusing [IEF]), the use of a "+" indicates the presence of a hordein protein band, while a "-" denotes the lack of a hordein protein band.

**TABLE II**

Sample	Cultivar	Description	Band-----					
			A	B	C	D	E	F
A	Moravian 37	New Variety	-	-	+	-	+	-
P1	Cheri	Parent	+	+	-	-	-	-
P2	Galena	Parent	-	-	+	+	+	+
P3	CH35-3-7	Parent	+	+	-	-	-	-
P4	Crystal	Parent	-	-	+	-	+	-

Referring now to TABLE I, TABLE II, and Attachments B-3 to B-5, each of the above-listed varieties (Cheri, Galena, CH35-3-7, and Crystal) will now be discussed relative to the subject variety (Moravian 37).

1. Moravian 37 v. Cheri:

The above-listed IEF protein banding pattern associated with Moravian 37 (- - + - + -) is **significantly different** compared with the protein banding pattern for Cheri (+ + - - - -), thereby conclusively demonstrating that both varieties are undeniably distinct from each other which satisfies all statutory requirements. In particular, see bands "A", "B", "C", and "E". This is clearly confirmed by a visual review of Attachments B-3 to B-5.

2. Moravian 37 v. Galena:

The above-listed IEF protein banding pattern associated with Moravian 37 (- - + - + -) is **significantly different** compared with the protein banding pattern for Galena (- - + + + +), thereby conclusively demonstrating that both varieties are undeniably distinct from each other which satisfies all statutory requirements. In particular, see bands "D" and "F". This is clearly confirmed by a visual review of Attachments B-3 to B-5

A visual assessment of the banding patterns presented in the gel film of Attachments B-3 to B-5 clearly demonstrates that the pattern associated Moravian 37 is distinctively different compared with the patterns pertaining to both Cheri and Galena (the two varieties that are again the most similar to and/or most closely resemble Moravian 37.) Accordingly, the information provided above regarding Moravian 37, Cheri, and Galena constitutes clear and convincing evidence of distinctness which satisfies all statutory requirements.

As previously noted, IEF protein banding patterns were also provided for two (2) other varieties, namely parental varieties CH35-3-7 and Crystal. An assessment of these varieties is as follows:

A. Moravian 37 v. CH35-3-7:

The above-listed IEF protein banding pattern associated with Moravian 37 (- - + - + -) is **significantly different** compared with the protein banding pattern for CH35-3-7 (+ + - - - -), thereby conclusively demonstrating that both varieties are undeniably distinct from each other which satisfies all statutory requirements. In particular, see bands "A", "B", "C" and "E". This is clearly confirmed by a visual review of Attachments B-3 to B-5

B. Moravian 37 v. Crystal:

The **overall** IEF protein banding pattern associated with Moravian 37 is slightly different compared with the protein banding pattern for Crystal. This is confirmed by a direct visual review of Attachments B-3 to B-5. While this difference does, in fact, exist as shown in Attachments B-3 to B-5, it is also noted that both varieties generally exhibited a (- - + - + -) protein banding pattern for bands "A" through "F". However, Moravian 37 and Crystal are, in fact, **significantly different and distinct varieties** which will be clearly confirmed below in connection with the **agronomic data** presented in the next section of this Exhibit. Likewise, regarding phenotypical characteristics (e.g. resemblance as set forth in Exhibit C) and other features, all of which have been collectively considered in this case, it has been determined the Crystal is **not** one of the varieties that are most similar to and/or most closely resemble Moravian 37. The closest varieties instead involve Cheri and Galena which are clearly distinguishable from Moravian 37 based on the protein banding data/profiles set forth above. However, information is being provided regarding other varieties aside from Cheri and Galena in order to set forth a full and complete disclosure.

With respect to the above-listed IEF protein banding data presented above, some further points of information must be emphasized at this point. IEF protein banding technology is highly sophisticated and accurate when used to differentiate barley varieties from each other. In this regard, when the IEF protein banding patterns for two particular varieties are compared and such banding patterns are clearly **different**, this difference constitutes a **definitive indication** of the distinct nature of one variety

relative to the other that would eliminate any need to present further evidence of distinctness in the form of agronomic data and the like. Thus, the analysis can stop at that point. In other words, a clear difference in protein banding profiles between two varieties is sufficient **alone** to support a claim of distinctness which is self-evident regarding the distinctness of Moravian 37 relative to (1) Cheri; (2) Galena; and (3) CH35-3-7.

However, when the IEF protein banding patterns of two particular varieties are similar as in the case of Moravian 37 v. Crystal, this does **not** automatically mean that both varieties are the same, comparable, or indistinct from each other. On the contrary, it merely means that such varieties have similar IEF protein banding patterns and nothing more. Accordingly, in such a situation, a comparison of the varieties in question merely proceeds to the next step, namely, the assessment and presentation of **agronomic data**. In the present case, this data offers **clear, convincing, and undeniable evidence of distinctness** regarding Moravian 37 compared with Crystal. Such agronomic data will now be presented with primary reference to Crystal (although data for a number of other varieties will also be set forth including those listed above in TABLES I and II, with this data confirming the distinctness of Moravian 37 relative to such varieties and others).

### B. Agronomic Data

**Agronomic data** was collected and reviewed on many of the barley varieties included in the pedigree associated with Moravian 37, as well as other commonly-grown control varieties. This data is useful to clearly distinguish Moravian 37 from its parents and related cultivars (including those varieties which are considered to be the most similar to and/or most closely resemble Moravian 37.) These closest varieties again include (1) Cheri; and (2) Galena.

The tests discussed below were designed to demonstrate and assess various genetic improvements in barley varieties. The objective of the testing processes was to provide an unbiased appraisal and evaluation of currently-available varieties and advanced experimental lines including Moravian 37 which is the subject of this

application. Basically, the tests summarize trials conducted by the Coors Brewing Company (Applicant) in multiple years and locations including (1) Burley, ID (USA) [in some cases referred to as "SI" or "Southern Idaho"]; (2) Berthoud, CO (USA) [in some cases referred to as "NC" or "Northern Colorado"]; and (3) Center, CO (USA) [in some cases referred to as "SC" or "Southern Colorado"]. In addition, trials were conducted by employees of the University of Idaho at various locations in the State of Idaho during the 1998 - 2000 crop years, with such locations being set forth below.

Most of the test data provided below also includes a "Least Significant Difference" (LSD) statistic. Where "LSD" statistics are given, they are presented at either the 0.05% error level or the 0.10% error level (depending on which data summaries/tables are involved) and are an aid in comparing varieties. The Coefficient of Variation ("CV") statistic is also included in most of the data summaries/tables and provides a general measure of the precision associated with each experimental trial. Furthermore, the present variety of interest for which protection is sought will be identified in the data summaries/tables set forth below as "Moravian 37", "M37", or "C37".

As previously stated, there are **clear and substantial differences** in important genetic, morphological, and phenotypical characteristics when Moravian 37 is compared to other varieties and parental lines (with particular reference to Galena, Crystal, Cheri, and CH35-3-7). Such differences overwhelmingly support the allowability of the present application under all applicable statutory guidelines. The data of interest and primary concern will now be discussed as follows:

1. Moravian 37 v. Galena

[i]       **\*\*Moravian 37 has a significantly higher Test Weight (bu/ac[=bushels/acre]) or (lb/bu[=pounds/bushel]) than Galena.\*\***

This key difference is clearly illustrated in:

A. The data table provided herewith as Attachment B-6 (entitled "2000 VARIETY PERFORMANCE TRIAL BURLEY, IDAHO"). This table sets forth a Test Weight value (bu/ac) of **55.0** for Moravian 37 (e.g. C37) v. a Test Weight value (bu/ac) of **54.3** for Galena.

B. The data table provided herewith as Attachment B-7 (entitled "2000 VARIETY PERFORMANCE TRIAL BERTHOUD, COLORADO"). This table sets forth a Test Weight value (bu/ac) of **52.8** for Moravian 37 (e.g. C37) v. a Test Weight value (bu/ac) of **52.3** for Galena.

C. The data table provided herewith as Attachment B-8 (entitled "2000 VARIETY PERFORMANCE TRIAL CENTER, COLORADO"). This table sets forth a Test Weight value (bu/ac) of **54.0** for Moravian 37 (e.g. C37) v. a Test Weight value (bu/ac) of **52.8** for Galena.

D. The data table provided herewith as Attachment B-9 (entitled "1999 BURLEY, IDAHO COORS VARIETY [SIC.] PERFORMANCE TRIAL"). This table sets forth a Test Weight value (lb/bu) of **53.6** for Moravian 37 (e.g. C37) v. a Test Weight value (lb/bu) of **52.6** for Galena.

E. The data table provided herewith as Attachment B-10 (entitled "1999 BERTHOUD, COLORADO COORS VARIETY PERFORMANCE TRIAL"). This table sets forth a Test Weight value (lb/bu) of **51.7** for Moravian 37 (e.g. C37) v. a Test Weight value (lb/bu) of **50.1** for Galena.

F. The data table provided herewith as Attachment B-11 (entitled "1999 CENTER, COLORADO COORS VARIETY [SIC.] TRIAL"). This table sets forth a Test Weight value (lb/bu) of **53.5** for Moravian 37 (e.g. C37) v. a Test Weight value (lb/bu) of **51.8** for Galena.

G. The data table provided herewith as Attachment B-12 (entitled "1998 COMBINED LOCATIONS VARIETY PERFORMANCE TRIAL") which sets forth a **mean** Test Weight value (lb/bu) of **53.5** for Moravian 37 (e.g. C37) v. a **mean** Test Weight value (lb/bu) of **52.3** for Galena. It should likewise be noted that all of the **individual** tests/trials associated with Attachment B-12 set forth a higher Test Weight value for Moravian 37 compared with Galena.



H. Also of interest are the multiple data tables collectively provided herewith as Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000" and available at the following Internet address: "[www.uidaho.edu/aberdeen/cereals/00report/00report.htm](http://www.uidaho.edu/aberdeen/cereals/00report/00report.htm)"). The **average** Test Weight value (lb/bu) for Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **54.875** for Moravian 37 (e.g. C37) v. **53.725** for Galena. Table 31 was not used in the above-listed calculations because it does not list Galena. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should also be noted that **all** four (4) of the above-listed tests individually indicated that the Test Weight was greater for Moravian 37 compared with Galena.

Finally, in accordance with Table 35 which presents an average of data obtained from Kimberly, ID [USA], Rupert, ID [USA], Aberdeen, ID [USA], and Idaho Falls, ID [USA] for multiple years, Moravian 37 (e.g. C37) had an average Test Weight value (lb/bu) for 1999-2000 of **53.8**, with Galena having an average Test Weight value (lb/bu) for 1999-2000 of **52.6**.

I. Of further interest are the multiple data tables collectively provided herewith as Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999" and available at the following Internet address: "[www.uidaho.edu/aberdeen/cereals/99report/99report.htm](http://www.uidaho.edu/aberdeen/cereals/99report/99report.htm)"). The **average** Test Weight value (lb/bu) for Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), Table 28 (Ririe, ID [USA] 1999), and Table 29 (Ashton, ID [USA] 1999) is **53.1** for Moravian 37 (e.g. C37) v. **51.92** for Galena. It should also be noted that out of the five (5) tests associated with Attachment B-14 which pertain to Test Weight, four (4) of the five (5) tests individually showed a greater Test Weight for Moravian 37 compared with Galena. One (1) test (as shown in Table 25) set forth a Test Weight (lb/bu) of 49.2 for Moravian 37 (e.g. C37) v. a Test Weight

(lb/bu) of 49.3 for Galena that could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

**[ii] \*\*Moravian 37 has a significantly larger Plump Kernel % than Galena.\*\***

"Plump Kernel %" is a routinely measured characteristic defined to involve the % of grain which remains on top of a shaken 6/64 inch slotted screen. This key difference is clearly illustrated in:

A. The data table provided herewith as Attachment B-6 (entitled "2000 VARIETY PERFORMANCE TRIAL BURLEY, IDAHO"). This table sets forth a Plump Kernel % value (6/64 screen) of **98** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **95** for Galena.

B. The data table provided herewith as Attachment B-7 (entitled "2000 VARIETY PERFORMANCE TRIAL BERTHOUD, COLORADO"). This table sets forth a Plump Kernel % value (6/64 screen) of **97** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **95** for Galena.

C. The data table provided herewith as Attachment B-8 (entitled "2000 VARIETY PERFORMANCE TRIAL CENTER, COLORADO"). This table sets forth a Plump Kernel % value (6/64 screen) of **98** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **93** for Galena.

D. The data table provided herewith as Attachment B-9 (entitled "1999 BURLEY, IDAHO COORS VARIETY [SIC.] PERFORMANCE TRIAL"). This table sets forth a Plump Kernel % value (6/64 screen) of **96** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **90** for Galena.

E. The data table provided herewith as Attachment B-10 (entitled "1999 BERTHOUD, COLORADO COORS VARIETY PERFORMANCE TRIAL"). This table sets forth a Plump Kernel % value (6/64 screen) of **93** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **86** for Galena.

F. The data table provided herewith as Attachment B-11 (entitled "1999 CENTER, COLORADO COORS VARIETY [SIC.] TRIAL"). This table sets forth a Plump Kernel % value (6/64 screen) of **98** for Moravian 37 (e.g. C37) v. a Plump Kernel % value (6/64 screen) of **92** for Galena.

G. The data table provided herewith as Attachment B-12 (entitled "1998 COMBINED LOCATIONS VARIETY PERFORMANCE TRIAL"). This table sets forth a **mean** Plump Kernel % value (6/64 screen) of **96.1** for Moravian 37 (e.g. C37) v. a **mean** Plump Kernel % value (6/64 screen) of **91.2** for Galena. It should likewise be noted that all of the **individual** tests/trials associated with Attachment B-12 set forth a higher Plump Kernel % value for Moravian 37 compared with Galena.

H. Also of interest are the multiple data tables collectively provided herewith as Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). The **average** Plump Kernel % value (6/64 screen) from Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **97.5** for Moravian 37 (e.g. C37) and **95.75** for Galena. Table 31 was not used in the above-listed calculations because it does not list Galena. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should also be noted that out of the four (4) tests associated with Attachment B-13 which pertain to Plump Kernel %, three (3) of the four (4) tests individually showed a greater Plump Kernel % value for Moravian 37 compared with Galena, with one (1) test (Table 29) showing a Plump Kernel % value of 97 for both varieties that could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

Finally, in accordance with Table 35 which presents an average of data obtained from Kimberly, ID [USA], Rupert, ID [USA], Aberdeen, ID [USA], and Idaho Falls, ID [USA] for multiple years, Moravian 37 (e.g. C37) had an average Plump

Kernel % value (6/64 screen) for 1999 - 2000 of **95**, with Galena having an average Plump Kernel % value (6/64 screen) for 1999 - 2000 of **90**.

**[iii] \*\*Moravian 37 has an earlier Heading Date from planting (or other specified date) than Galena\*\***

Heading date is generally defined as the number of days from planting (or other specified date) that it takes for 50% of the heads to emerge from the boot. This key difference is clearly illustrated in:

A. The data table provided herewith as Attachment B-7 (entitled "2000 VARIETY PERFORMANCE TRIAL BERTHOUD, COLORADO"). This table sets forth a Heading Date (days from planting) of **92** for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of **93** for Galena.

B. The data table provided herewith as Attachment B-8 (entitled "2000 VARIETY PERFORMANCE TRIAL CENTER, COLORADO"). This table sets forth a Heading Date (days from planting) of **68** for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of **72** for Galena.

C. The data table provided herewith as Attachment B-9 (entitled "1999 BURLEY, IDAHO COORS VARIETY [SIC.] PERFORMANCE TRIAL"). This table sets forth a Heading Date (days from planting) of **87** for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of **88** for Galena.

D. The data table provided herewith as Attachment B-10 (entitled "1999 BERTHOUD, COLORADO COORS VARIETY PERFORMANCE TRIAL"). This table sets forth a Heading Date (days from planting) of **89** for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of **90** for Galena.

E. The data table provided herewith as Attachment B-11 (entitled "1999 CENTER, COLORADO COORS VARIETY [SIC.] TRIAL"). This table sets forth a Heading Date (days from planting) of **83** for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of **84** for Galena.

F. The data table provided herewith as Attachment B-12 (entitled "1998 COMBINED LOCATIONS VARIETY PERFORMANCE TRIAL"). This table sets forth a **mean** Heading Date (days

from planting) of **77.8** for Moravian 37 (e.g. C37) v. a **mean** Heading Date (days from planting) of **78.4** for Galena. It should also be noted that out of the three (3) tests associated with each variety in Attachment B-12 which pertain to Heading Date, two (2) of the three (3) tests individually showed an earlier Heading Date for Moravian 37 compared with Galena. One (1) test (e.g. from Southern Colorado or "SC") set forth a Heading Date (days from planting) of 74.0 for Moravian 37 (e.g. C37) v. a Heading Date (days from planting) of 73.0 for Galena that could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

G. The data table provided herewith as Attachment B-6 (entitled "2000 VARIETY PERFORMANCE TRIAL BURLEY, IDAHO) sets forth a Heading Date (days from planting) of **78** for Moravian (e.g. C37) v. a Heading Date (days from planting) of **78** for Galena. While an equivalent heading date was received in connection with this particular test, such results could be considered an anomaly relative to the data associated with tests A - F above. Specifically, it should be noted that out of the nine (9) individual tests set forth in Attachments B-6 through B-12 (including the three [3] individual trials in Attachment B-12) which pertain to Heading Date, seven (7) out of the nine (9) tests individually showed an earlier Heading Date for Moravian 37 compared with Galena. Likewise, the **average** Heading Date (days from planting) involving all nine (9) tests listed above was **81.16** for Moravian 37 (e.g. C37) v. **82.24** for Galena, with this difference constituting clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

H. Also of interest are the multiple data tables collectively provided herewith as Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). The **average** Heading Date (**days from Jan. 1**) for Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **168** for Moravian 37 (e.g. C37) v. **169.75** for Galena. Table 31 was not used in the above-listed calculations because it does not list Galena. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in

Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should also be noted that out of the four (4) tests associated with Attachment B-13 which pertain to Heading Date, three (3) of the four (4) tests individually set forth an earlier Heading Date for Moravian 37 compared with Galena. One (1) test (Table 34) showed a Heading Date of 177 for both varieties that could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

I. Of further interest are the multiple data tables collectively provided herewith as Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999"). The **average** Heading Date (**days from Jan. 1**) for Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), Table 28 (Ririe, ID [USA] 1999), and Table 29 (Ashton, ID [USA] 1999) is **184.6** for Moravian 37 (e.g. C37) v. **185.4** for Galena. It should also be noted that out of the five (5) tests associated with Attachment B-14 which pertain to Heading Date, three (3) of the five (5) tests individually showed an earlier Heading Date for Moravian 37 compared with Galena. One (1) test (Table 24) set forth a Heading Date of 172 for both varieties and another test (Table 28) recited a Heading Date of 190 for both varieties. Both of such tests could be considered anomalies relative to the above-listed other tests. Such other tests (e.g. those in Tables 25, 27, and 29), along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Galena.

**Accordingly, Moravian 37 is entirely distinct relative to Galena based on all of the information presented above (both agronomic data and IEF protein band testing) which is clear and convincing.**

## 2. Moravian 37 v. Crystal

[i] **\*\*Moravian 37 has a substantially shorter Plant Height compared with Crystal\*\***

This key difference is clearly illustrated in:

A. Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). This document involves a number of tests, **all** of which **individually** and **collectively** indicate that Moravian 37 has a substantially shorter Plant Height compared with Crystal. For example, the **average** Plant Height (inches) from Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 31 (Arco, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **29.2** for Moravian 37 (e.g. C37) v. **34.4** for Crystal. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should again be noted that **all** five (5) of the above-listed tests indicated that Moravian 37 had a substantially shorter Plant Height compared with Crystal.

B. Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999"). This document involves a number of tests, **all** of which **individually** and **collectively** indicate that Moravian 37 has a substantially shorter Plant Height compared with Crystal. For example, the **average** Plant Height (inches) from Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), Table 28 (Ririe, ID [USA] 1999), and Table 29 (Ashton, ID [USA] 1999) is **29.2** for Moravian 37 (e.g. C37) v. **35** for Crystal. It should again be noted that **all** five (5) of the above-listed tests indicated that Moravian 37 had a substantially shorter Plant Height compared with Crystal.

C. Direct comparative agronomic data is provided for a comparison between Moravian 37 and Crystal in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. Regarding Plant Height, Moravian 37 is again shorter than Crystal. As noted in Attachment B-15, Moravian 37 had a Plant Height (inches) of **29**, with Crystal having a Plant Height (inches) of **31**.

**[ii] \*\*Moravian 37 has a significantly larger Plump Kernel % than Crystal\*\***

As noted above, "Plump Kernel %" is a routinely measured characteristic defined to involve the % of grain which remains on top of a shaken 6/64 inch slotted screen. This key difference is clearly illustrated in:

A. Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). This document involves a number of tests, **all** of which **individually** and **collectively** indicate that Moravian 37 has a substantially larger Plump Kernel % than Crystal. For example, the **average** Plant Kernel % (6/64 screen) from Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 31 (Arco, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **97** for Moravian 37 (e.g. C37) and **93** for Crystal. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should again be noted that **all** five (5) of the above-listed tests indicated that Plump Kernel % was greater for Moravian 37 compared with Crystal.

Finally, in accordance with Table 35 which involves an average of data obtained from Kimberly, ID [USA], Rupert, ID [USA], Aberdeen, ID [USA], and Idaho Falls, ID [USA] for multiple years, Moravian 37 (e.g. C37) had an average Plump



Kernel % value (6/64 screen) for 1999 - 2000 of **95**, with Crystal having an average Plump Kernel % value (6/64 screen) for 1999 - 2000 of **91**.

B. Direct comparative agronomic data is provided for a comparison between Moravian 37 and Crystal in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. Regarding Plump Kernel %, Moravian 37 is again greater than Crystal. As noted in Attachment B-15, Moravian 37 had a Plump Kernel % of **98**, with Crystal having a Plump Kernel % of **96**.

**[iii] \*\*Moravian 37 has a significantly greater Yield compared with Crystal\*\***

This key difference is clearly illustrated in:

A. Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). This document involves a number of tests/comparisons which are set forth in Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 31 (Arco, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000).

In the foregoing data tables, **twelve (12)** separate yield comparisons were made between Moravian 37 and Crystal. In all but one (1) of these comparisons (e.g. in eleven [11] out of twelve [12] comparisons), Moravian 37 demonstrated a higher yield (bu/A [=bushels/acre]) compared with Crystal which provides clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal. Regarding the one (1) exception (Table 29 - 1999 Yield), this could be considered an anomaly relative to the other tests/comparisons, with such other tests/comparisons providing important evidence of the distinctness of Moravian 37 versus Crystal. Furthermore, with reference to the year 2000 (the only year in which data was available in connection with all of the Yield comparisons associated with Attachment B-13), the greater Yield exhibited by

Moravian 37 is self-evident. Specifically, the average Yield (bu/A) for Moravian 37 in the year 2000 was **134.98**, with the average Yield (bu/A) in the year 2000 for Crystal being **124.66**. Table 28 was not used in the above-listed assessment because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative.

Finally, in accordance with Table 35 which involves an average of data obtained from Kimberly, ID [USA], Rupert, ID [USA], Aberdeen, ID [USA], and Idaho Falls, ID [USA] for multiple years, Moravian 37 (e.g. C37) had an average Yield (bu/A) for 1999 - 2000 of **129.9**, with Crystal having an average Yield (bu/A) for 1999 - 2000 of **123**.

B. Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999"). This document involves a number of tests/comparisons which are set forth in Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), Table 28 (Ririe, ID [USA] 1999), and Table 29 (Ashton, ID [USA] 1999). Such tests collectively indicate that Moravian 37 is characterized by greater Yields compared with Crystal.

In the foregoing data tables, **eight (8)** separate yield comparisons were made between Moravian 37 and Crystal. In all but one (1) of these comparisons (seven [7] out of eight [8] comparisons), Moravian 37 demonstrated a higher yield (bu/A) compared with Crystal which provides clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal. Regarding the one (1) exception (Table 24 - 1999 Yield), this could be considered an anomaly relative to the other tests/comparisons, with such other tests/comparisons providing important evidence of the distinctness of Moravian 37 versus Crystal.

C. Direct comparative agronomic data is provided for a comparison between Moravian 37 and Crystal in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be

undertaken. Regarding Yield, Moravian 37 is again greater than Crystal. As noted in Attachment B-15, Moravian 37 showed a Yield (lbs/plot) of **12.36**, with Crystal having a Yield (lbs/plot) of **11.72**.

**[iv] \*\*Moravian 37 has significantly less Plant Lodging compared with Crystal\*\***

Plant Lodging (%) is generally defined to involve the percent of the plot area that was not standing straight prior to harvest. This key difference is clearly illustrated in:

A. Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). This document involves a number of tests, the average of which clearly indicate that Moravian 37 has less Plant Lodging to a significant degree compared with Crystal. Specifically, the **average** Plant Lodging from Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 31 (Arco, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **8%** for Moravian 37 (e.g. C37) v. **23.4%** for Crystal. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should also be noted that out of the five (5) tests associated with Attachment B-13, four (4) of the five (5) tests individually showed substantially less Plant Lodging for Moravian 37 compared with Crystal. One (1) test (Table 29) set forth 0% Plant Lodging for both varieties which could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal.

B. Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999"). This document involves a number of tests, the average of which

clearly indicate that Moravian 37 has less Plant Lodging to a significant degree compared with Crystal. Specifically, the **average** Plant Lodging from Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), and Table 29 (Ashton, ID [USA] 1999) is **26%** for Moravian 37 (e.g. C37) v. **50.75%** for Crystal. Table 28 (Ririe, ID [USA] 1999) was not used because it did not include Plant Lodging data. It should also be noted that, out of the four (4) tests associated with Attachment B-13, three (3) of the four (4) tests individually showed substantially less Plant Lodging for Moravian 37 compared with Crystal. One (1) test (Table 24) showed 2% Plant Lodging for Moravian 37 and 0% Plant Lodging for Crystal which could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal.

C. Direct comparative agronomic data is provided for a comparison between Moravian 37 and Crystal in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 showed **5%** Plant Lodging, with Crystal having a Plant Lodging value of **20%**.

**[v] \*\*Moravian 37 has a higher Test Weight (lb/bu) compared with Crystal\*\***

This key difference is clearly illustrated in:

A. Attachment B-14 (entitled "1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley for Southcentral & Southeastern Idaho, 1999"). This document involves a number of tests, **all** of which **individually** and **collectively** indicate that Moravian 37 has a higher Test Weight (lb/bu) than Crystal. For example, the **average** Test Weight (lb/bu) from Table 24 (Kimberly, ID [USA] 1999), Table 25 (Rupert, ID [USA] 1999), Table 27 (Aberdeen, ID [USA] 1999), Table 28 (Ririe, ID [USA] 1999),

and Table 29 (Ashton, ID [USA] 1999) is **53.1** for Moravian 37 (e.g. C37) v. **52.1** for Crystal. It should again be noted that **all** five (5) of the above-listed tests individually indicated that Test Weight (lb/bu) was greater for Moravian 37 compared with Crystal.

B. Attachment B-13 (entitled "2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO - Spring Barley - South-central & Southeastern Idaho, 2000"). This document involves a number of tests, the **average** of which clearly indicate that Moravian 37 has a higher Test Weight (lb/bu) than Crystal. Specifically, the average Test Weight (lb/bu) from Table 29 (Kimberly, ID [USA] 2000), Table 30 (Rupert, ID [USA] 2000), Table 31 (Arco, ID [USA] 2000), Table 33 (Aberdeen, ID [USA] 2000), and Table 34 (Idaho Falls, ID [USA] 2000) is **54.78** for Moravian 37 (e.g. C37) and **54.36** for Crystal. Table 28 was not used because it simply involves an average of data from Tables 29 and 30, with the data in Table 28 therefore being merely duplicative. Likewise, Table 32 was not used because it simply involves an average of data from Tables 33 and 34, with the data in Table 32 therefore being merely duplicative. It should also be noted that, out of the five (5) tests associated with Attachment B-13, three (3) of the five (5) tests individually showed a higher Test Weight (lb/bu) for Moravian 37 compared with Crystal. One (1) test (Table 30) set forth a Test Weight (lb/bu) of 54 for Moravian 37 and a Test Weight (lb/bu) of 54.1 for Crystal, with another test (Table 31) reciting a Test Weight (lb/bu) of 54.4 for Moravian 37 and a Test Weight (lb/bu) of 54.8 for Crystal. Both of such tests could be considered anomalies relative to the above-listed other tests. Such other tests (e.g. those in Tables 29, 33, and 34), along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal.

Likewise, and of further importance, Table 35 involves an average of data obtained from Kimberly, ID [USA], Rupert, ID [USA], Aberdeen, ID [USA], and Idaho Falls, ID [USA] for multiple years. In this Table, Moravian 37 (e.g. C37) had an average Test Weight (lb/bu) for 1999 - 2000 of **53.8**, with Crystal having an average Test Weight (lb/bu) for 1999 - 2000 of **52.9**.

C. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and Crystal

in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, both Moravian 37 and Crystal showed a Test Weight (lb/bu) of 54.8. This particular parameter in Attachment B-15 could be considered an anomaly relative to the above-listed other tests. Such other tests, along with the **average** data presented above, constitute clear and convincing evidence of the distinctness of Moravian 37 relative to Crystal.

**Accordingly, Moravian 37 is entirely distinct relative to Crystal based on all of the information presented above which is clear and convincing.**

### **3. Moravian 37 v. Cheri**

As noted above in the particular section of this Exhibit which pertains to IEF protein banding analysis, both Moravian 37 and Cheri are characterized by distinctively different protein banding profiles. This data constitutes definitive evidence of the distinct nature of Moravian relative to Cheri and is sufficient, by itself, to support the allowability of Moravian 37 as a totally distinct variety compared with Cheri. However, as supplemental/extra evidence, the following agronomic differences and data are provided concerning Moravian 37 and Cheri:

**[i] \*\*Moravian 37 has a substantially taller Plant Height compared with Cheri\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and Cheri in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Plant Height (inches) of **29** while Cheri had a Plant

Height (inches) of 27, with both varieties therefore being distinctively different from each other in overall appearance.

**[ii] \*\*Moravian 37 has a substantially greater Yield (lbs/plot) compared with Cheri\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and Cheri in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Yield (lbs/plot) of 12.36, with Cheri having a Yield (lbs/plot) of 10.92.

**[iii] \*\*Moravian 37 has greater Plant Lodging compared with Cheri\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and Cheri in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Plant Lodging of 5% compared with a Plant Lodging value of 0% for Cheri.

Other differences between both varieties are noted in Attachment B-15. Accordingly, Moravian 37 is entirely distinct relative to Cheri based on all of the information presented above (including agronomic and IEF protein banding data) which is clear and convincing.

#### **4. Moravian 37 v. CH35-3-7:**

As noted above in the particular section of this Exhibit which pertains to IEF protein banding analysis, both Moravian 37 and CH35-3-7 are characterized by

distinctively different protein banding profiles. This data constitutes definitive evidence of the distinct nature of Moravian relative to CH35-3-7 and is sufficient, by itself, to support the allowability of Moravian 37 as a totally distinct variety compared with CH35-3-7. However, as supplemental/extra evidence, the following agronomic differences and data are provided concerning Moravian 37 and CH35-3-7:

**[i] \*\*Moravian 37 has a substantially taller Plant Height compared with CH35-3-7\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and CH35-3-7 in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Plant Height (inches) of **29** while CH35-3-7 had a Plant Height (inches) of **26**, with both varieties therefore being distinctively different from each other in appearance.

**[ii] \*\*Moravian 37 has a substantially greater Yield (lbs/plot) compared with CH35-3-7\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and CH35-3-7 in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Yield (lbs/plot) of **12.36**, with CH35-3-7 having a Yield (lbs/plot) of **10.38**.

**[iii] \*\*Moravian 37 has a substantially later Heading Date compared with CH35-3-7\*\***



A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and CH35-3-7 in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a June Heading Date which was **seven (7) days later** than that of CH35-3-7.

**[iv] \*\*Moravian 37 has less Plant Lodging compared with CH35-3-7\*\***

A. Direct comparative agronomic data is again provided for a comparison between Moravian 37 and CH35-3-7 in Attachment B-15 (entitled "2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL"). In this trial, field plots (4 ft. by 13 ft.) were planted for Moravian 37 (e.g. C37), Crystal, Cheri, and CH35-3-7 so that side-by-side assessments could be undertaken. As noted in Attachment B-15, Moravian 37 had a Plant Lodging of **5%** compared with a Plant Lodging value of **10%** for CH35-3-7.

Other differences between both varieties are noted in Attachment B-15. **Accordingly, Moravian 37 is entirely distinct relative to CH35-3-7 based on all of the information presented above (including agronomic and IEF protein banding data) which is clear and convincing.**

### Conclusion

It is entirely clear from the above-listed data that Moravian 37 is completely distinct compared with (1) Galena; (2) Cheri; (3) Crystal; and (4) CH35-3-7 in many different ways, thereby confirming the novelty and distinctness of Moravian 37 under all statutory guidelines. Accordingly, Applicant is entitled to Plant Variety Protection on Moravian 37 and should any further information be needed, it will be provided immediately upon request.

## Methodology for the Analysis of Barley Hordein Proteins by Isoelectric Focusing

- 1. Sample Preparation:** Individual barley seeds are crushed using a drill press equipped with a modified seed cutter. 200 microliters of extraction solution (30% 2-Chloroethanol in water) are added and the samples are vortexed vigorously for 30 seconds. Proteins are allowed to extract into the solution during an overnight incubation at 4° C. Samples may be centrifuged and frozen if analysis is not to be performed immediately.
- 2. Electrophoresis:** Seed extract proteins are separated using a Hypure VG-1040 isoelectric focusing gel. The gel is prepared as suggested by the manufacturer. Samples are loaded using a 48-well rubber template placed 1 cm from the cathode wick. Electrophoresis is allowed to progress at 12 watts for 45 minutes. The power is adjusted to 40 watts for an additional 60 minutes.
- 3. Staining with Silver:** This method was used for the Moravian 37 samples from Coors. The technique is highly sensitive and typically visualizes more bands making varietal differentiation easier. The VG-1040 gel is fixed and dried as described in step 3 above. Stain is prepared as follows: To 70 ml of deionized water add 10 ml of silver solution (2% silver nitrate, 2% ammonium nitrate), 10 ml of reduction moderator (10% tungstosilicic acid), 10 ml of Image development reagent (2.8% formaldehyde), and 100 ml of 5% sodium carbonate. Mix. Pour stain over gel in a glass baking dish on a rotary or rocking platform. Allow image to develop to desired intensity. Halt stain reaction with 5% acetic acid. Wash gel in water for 1 hour, dry. Store gel in dark area for best preservation.

200 100 112  
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Lot Number: A  
Submitted As: MORAVIAN 37 BARLEY  
Project: FINGERPRINTING

Lab #: 123-1-74809

Date Received: 08/25/2000  
Date Started: 08/28/2000  
Date Reported: 02/12/2001

COORS RESEARCH &amp; DEVELOPMENT

Attn: KATHY ADAMS

7 NORTH 400 W.

BURLEY, ID 83318

Phone: 208-678-4997 Fax: 208-678-9669

### Sample Information

Source: COORS

Condition:

**PO Number:**

# CERTIFICATE OF ANALYSIS

ee attached powerpoint file Isoelectric Focusing of Barley Hordein Proteins - 9/16/2000

STA Ref: 0000704006

Prepared By:

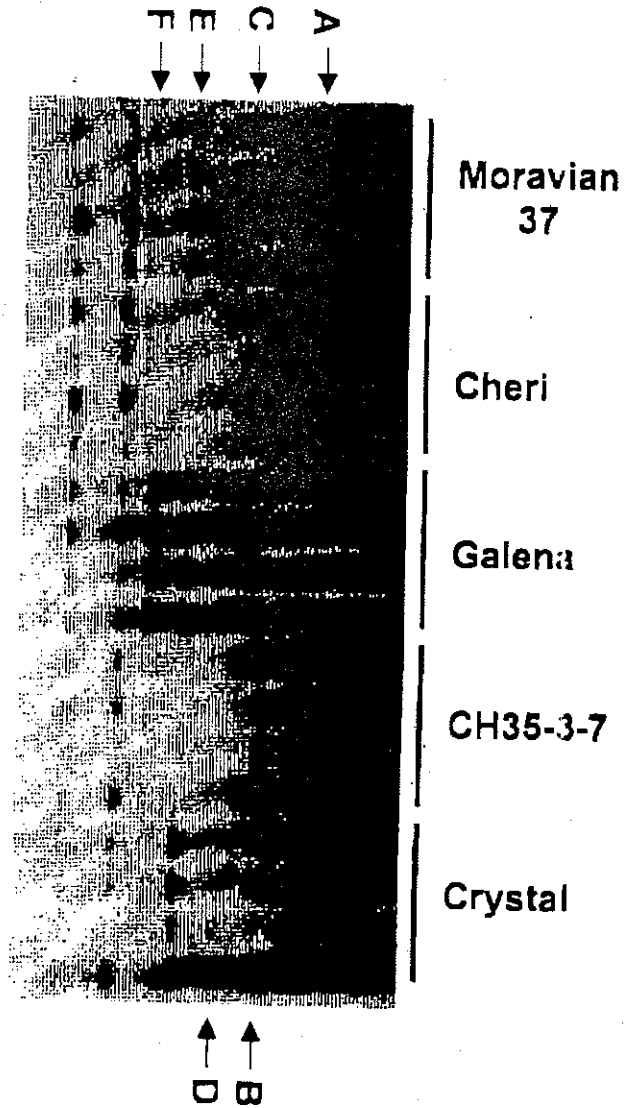
Daniel J. LaFlamme, Ph.D.

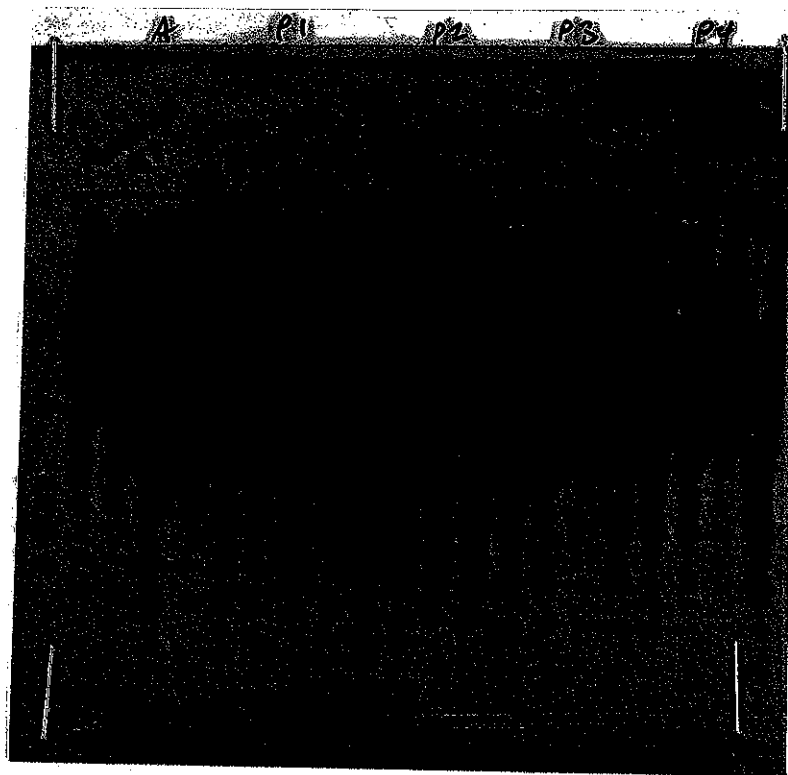
Director, Technical Operations

## Attachment B-2

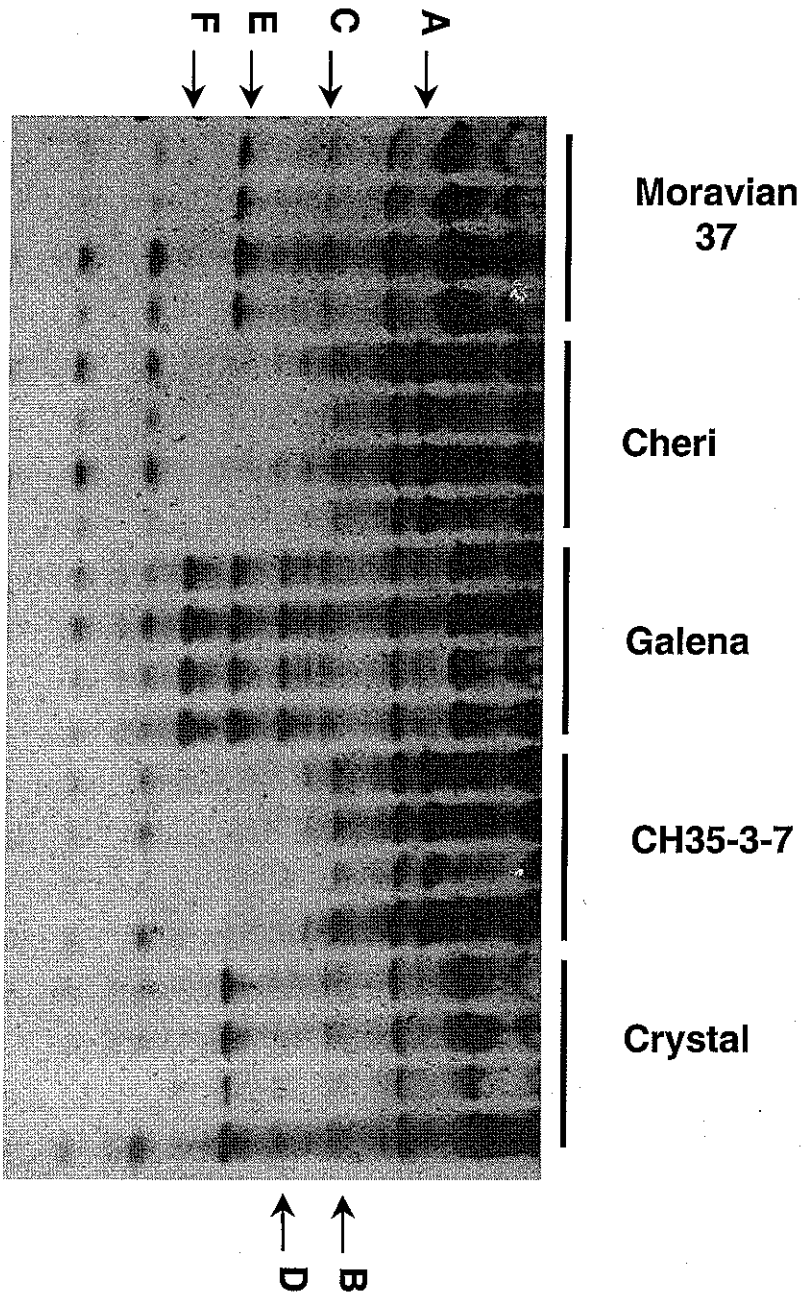
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FILE NAME: Isoelectric Focusing of Barley Hordein Proteins - 9/26/2000

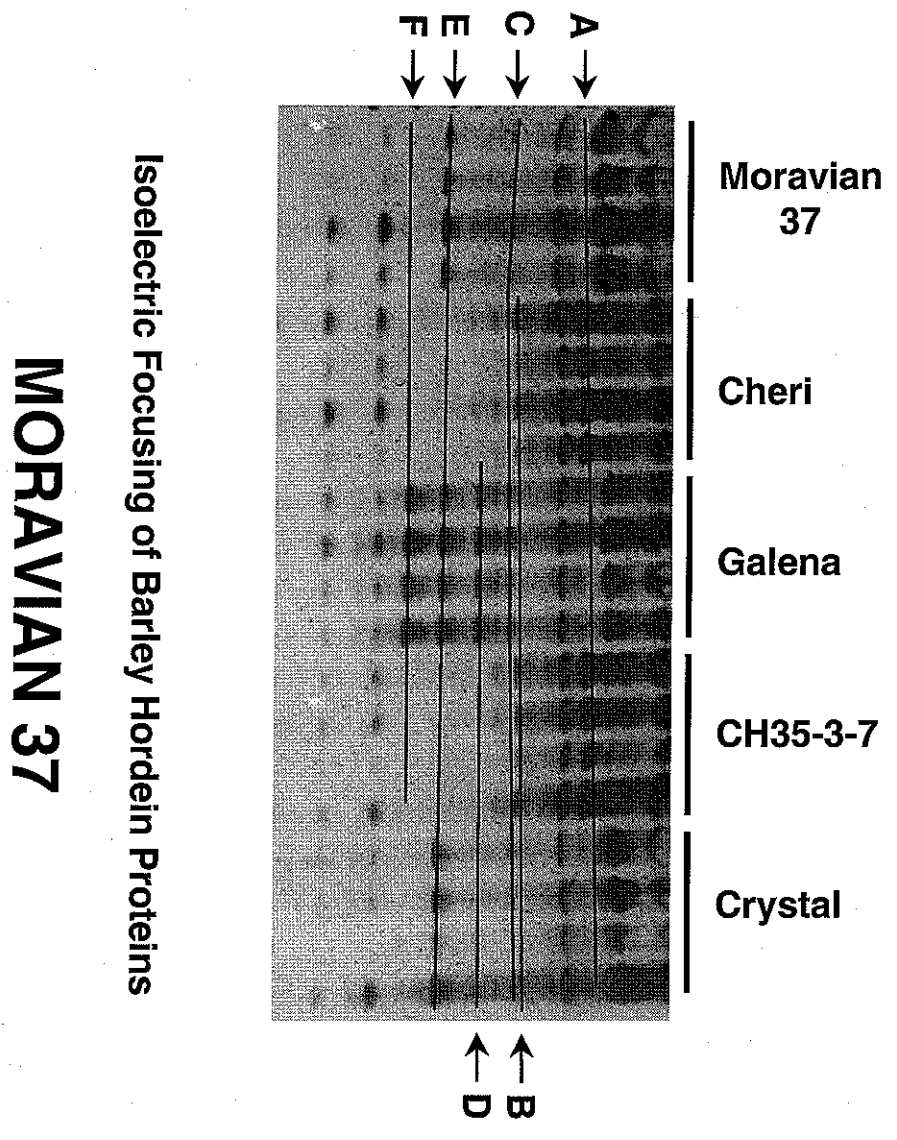




# Moravian 37



200 100 112



# 2000 VARIETY PERFORMANCE TRIAL BURLEY, IDAHO

ENTRY	NAME	I	6/64 Screen			TW	HDJUNE	HEAD		COLOR	MOIST	PLANT	
			YLD	YLD	YLD			DATE	days			HEIGHT	LODGE
			bu/acre	lbs/acre	lbs/acre	6/64	bulac			agtron	%	in	%
5	C37		165	8891	8446	98	55.0	14	78	52	9.5	28	3
1	GALENA		160	8618	8187	95	54.3	14	78	57	9.6	27	6
2	M14		165	8888	8444	93	55.0	4	68	54	9.6	25	4
3	MERIT		154	8333	7917	94	53.0	14	78	63	9.6	33	40
4	HARRINGTON		152	8201	7791	96	53.5	13	77	59	9.4	30	46
Reps													
		4	4	4	4	4.00	4	4	4.00	4	4	4.00	4
CV													
		6.25	6.25	6.25	1	1	0.8	19.0	12	12	1.5	6	122
LSD@0.05													
		10	564	564	1	1	0.4	1.8	6	6	0.1	2	10

200100112



200100112

# 2000 VARIETY PERFORMANCE TRIAL BERTHOUD, COLORADO

ENTRY	NAME	6/64 Screen		6/64 Screen		PLUMP	6/64 Screen		HEAD	6/64 Screen		6/64 Screen		PLANT
		YLD	YLD	YLD	YLD		YLD	YLD		YLD	YLD	YLD	YLD	
		bu/acre	lbs/acre	lbs/acre	lbs/acre	6/64	bu/acre	lbs/acre	days	agtron	MOIST	HT	LODGE	
1	C37	129	6711	6474	97	52.8	92	60	10.0	26	30			
2	M14	136	7081	6162	87	53.3	86	56	10.0	28	40			
3	GALENA	124	6447	6087	95	52.3	93	59	10.0	28	10			
4	B1202	120	6233	5808	93	52.8	93	65	10.0	32	55			
5	HARRINGTON	120	6227	5865	94	51.8	93	64	10.0	32	68			
	REPS	4	4	4	4	4.0	4	4	4.0	4	4			
	CV	7	7	7	2	1.0	2	7	1.1	6	58			
	LSD@0.05	10	524	477	2	0.6	2	5	0.1	2	16			

200100112

## 2000 VARIETY PERFORMANCE TRIAL CENTER, COLORADO

ENTRY	NAME	6/64 screen			HEAD			PLANT		
		YLD	YLD	YLD	DATE	TW	agron	MOIST	HT	LODGE
		bu/acre	lbs/acre	lbs/acre	days	bu/lac		%	in	%
5	C37	162	8437	8287	68	54.0	53	11.5	32	10
1	GALENA	157	8134	7525	72	52.8	51	11.8	33	5
2	M14	156	8110	7199	59	54.3	43	11.5	31	23
3	MERIT	139	7202	6409	73	50.8	47	11.0	38	80
4	HARRINGTON	138	7183	6967	65	52.5	42	11.8	37	85
	REPS	4	4	4	4	4.0	4	4.0	4	4
	CV	5	5	6	1	1.2	8	5.6	7	66
	LSD@0.05	10	501	513	1	0.8	4	0.7	2	13

Attachment B-8

1999 BURLEY, IDAHO COORS VARIETY PERFORMANCE TRIAL

-----YIELD-----

ENTRY	VARIETY	YIELD BU/AC	LBS/ ACRE	LBS/ PLOT	LBS/ ACRE	GRAIN PROTEIN %	6/64 SCREEN %	AGTRON COLOR	TEST WEIGHT LB/BU	DAYS TO HEAD	PLANT HEIGHT INCHES	PLANT LODGE %
6	C37 (C92-350)	187.3	9872	12.03	9477	12.3	96.0	60.0	53.6	87.0	34.0	0.0
1	GALENA	184.9	9744	11.87	8769	12.4	90.0	71.0	52.6	88.0	34.0	4.0
3	B1202	170.0	8960	10.92	7795	12.5	87.0	63.0	51.7	85.0	37.0	55.0
4	HARRINGTON	172.7	9102	11.09	8283	12.2	91.0	67.0	51.5	85.0	37.0	23.0
5	MORAVIAN 22	182.4	9612	11.71	9132	11.4	95.0	65.0	51.8	88.0	35.0	4.0

Above are means of 4 replications

LSD @ p = 0.05      14.79      780      0.95      3.40      5.50      0.92      1.80

C.V. %      5.74      2.60      6.00      1.25      5.40

**BOLD = significantly better than Galena**

2/3/2000

D:/99DATA/99VPT/VPT AGRON/ SIVPT DATA FINAL COPY

200100112

# 1999 Berthoud, Colorado Coors Variety Performance Trial

Variety	Heading Date - Days From Planting	Height Inches	Lodging %	Yield			Test Weight lbs/bu	Plump Grain % over 6/64"	Grain Moisture %	Agtron Color	% Grain Protein Dry Basis
				bu/ac	lbs/ac @ 12.5% H <sub>2</sub> O	lbs/ac over 6/64"					
<b>C37 (C92-350)</b>	89	33	28	165	8268	7702	51.7	93	11.1	41	11.4
GALENA	90	34	20	149	7458	6350	50.1	86	11.2	44	10.4
B1202	87	38	58	160	7990	7489	51.7	94	11.2	49	10.7
MORAVIAN 22	90	34	23	153	7622	7081	49.9	93	11.2	44	10.4
HARRINGTON	86	39	35	145	7217	6821	50.9	95	11.4	50	11.4
Above are means of 4 replications											
LSD @ 0.05	1.38	2.10	20.88	14.45	724.10	647.90	0.75	2.68	0.31	4.70	1.02
C.V. %	1.11	4.50	44.59	6.74	6.75	6.67	1.06	2.11	1.98	7.54	6.56

(Entries in bold are significantly better than Galena)

2/3/2000

# 1999 CENTER, COLORADO COORS VARIETY PERFORMANCE TRIAL

Variety	Heading Date - Days From Planting	Height Inches	Lodging %	Yield			Test Weight lbs/bu	Plump Grain % over 6/64"	Grain Moisture %	Agron Color	% Grain Protein Dry Basis
				bu/ac	lbs/ac @ 12.5% H <sub>2</sub> O	lbs/ac over 6/64"					
C37 (C92-350)	83	30	13	142	7107	6983	53.5	98	11.4	20	12.5
GALENA	84	33	15	140	7024	6432	51.8	92	11.7	20	13.2
MORAVIAN 22	84	32	13	147	7374	7095	51.4	96		23	12.5
HARRINGTON	81	38	5	145	7238	7129	52.7	99	11.6	19	
B1202	82	39	30	142	7107	6942	53.2	98	11.6		

Above are means of 4 replications

LSD @ 0.05	1.07	3.21	17.45	9.04	452.50	451.20	0.82	2.42	0.50	3.18	0.78
C.V. %	0.92	7.23	70.59	4.57	4.58	4.77	1.13	1.80	3.05	10.55	4.45

BOLD = significantly better than galena



# 2000 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO

University of Idaho College of Agriculture Cooperative Extension System  
Progress Report No. 342, January, 2001

Donnie Wicker, Larry Robertson, & Katherine O'Brien

<http://www.uidaho.edu/aberdeen/cereals/00report/00report.htm>

## Spring Barley- South-central & Southeastern Idaho, 2000

Table 28. Agronomic data for spring barley at Kimberly and Rupert, combined, irrigated, 2000.

Table 29. Agronomic data for spring barley at Kimberly, irrigated, 2000.

Table 30. Agronomic data for spring barley at Rupert, irrigated, 2000.

Table 31. Agronomic data for spring barley at Arco, irrigated, 2000.

Table 32. Agronomic data for spring barley at Aberdeen and Idaho Falls, combined, irrigated, 2000.

Table 33. Agronomic data for spring barley at Aberdeen, irrigated, 2000.

Table 34. Agronomic data for spring barley at Idaho Falls, irrigated, 2000.

Table 35. Yield, test weight, and plump data for spring barley from Kimberly, Rupert, Aberdeen, and Idaho Falls, irrigated, 1997-2000.

Table 28. Agronomic data for spring barley at Kimberly and Rupert, combined, irrigated, 2000.									
----- Yield (bu/A) -----				Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
Variety	Kimberly	Rupert	Average	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
M 37	137.9	144.1	141	54.8	31	164	5	97	0
Moravian 14	153.5	149	151.3	55.5	30	158	3	93	1
Baronesse	150.6	148.4	149.5	54.6	35	162	18	95	1
C32	130.1	156.6	143.4	54.4	28	165	0	96	0
Harrington	135.7	143.3	139.5	53.2	37	162	37	89	1
Idagold	124.2	153.1	138.7	53.4	27	167	2	93	1
Moravian 22	134.8	142.4	138.6	53.3	32	167	2	96	0
Galena	134.5	142.2	138.4	54.2	31	167	5	95	1
Crystal	137.5	124.8	131.2	54.4	36	164	28	93	1
Average	135.3	138.2	136.8	54	34	162	14	94	1

Table 29. Agronomic data for spring barley at Kimberly, irrigated, 2000.									
----- Yield (bu/A) -----				Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
Variety	1998	1999	2000	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
Moravian 37	101.6	132.2	137.9	55.6	28	160	0	97	0
Moravian 14	126.9	128.4	153.5	56.2	26	155	0	95	1
Baronesse	123.8	133.7	150.6	55.7	33	159	0	94	1
Crystal	100.7	136.8	137.5	54.6	34	161	0	94	1
B1202	107.3	122	136.7	53.8	34	158	0	97	0
Harrington	98.9	127.1	135.7	53.5	36	159	0	90	1
Moravian 22	112.1	130.4	134.8	54.1	28	164	0	97	0
Galena	107	123.3	134.5	54.9	27	163	0	97	1
C32	113.7	135.2	130.1	54.8	26	162	0	96	0
Idagold	95.4	121.2	124.2	53.7	26	163	0	93	0
Average	107.9	131.4	135.3	54.5	31	159	2	95	1
LSD.10	9.2	10.3	10.9	0.6	2	2	4	---	---
CV%	8.1	7.4	7.6	1.1	6	0.9	232.6	---	---

Table 30. Agronomic data for spring barley at Rupert, irrigated, 2000.

Variety	--- Yield (bu/A) ---			Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
	1998	1999	2000	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
Moravian 37	113.3	136	144.1	54	34	167	10	97	0
C32	119.7	145.9	156.6	53.9	31	169	0	96	1
Idagold	98.3	137.2	153.1	53.1	29	171	3	93	1
Moravian 14	129.1	151.2	149	54.7	35	162	7	92	1
Baronesse	106.9	130.3	148.4	53.5	36	166	37	95	1
Harrington	91.9	122.2	143.3	52.8	39	165	73	87	1
Moravian 22	116	144.3	142.4	52.5	36	169	3	96	1
Galena	102.8	147.6	142.2	53.4	34	170	10	94	1
B1202	116	123	135.3	53.1	39	165	23	95	1
Crystal	91.4	129.9	124.8	54.1	39	166	57	93	1
Average	105	131.8	138.2	53.5	37	165	27	94	1
LSD.10	13.5	13.7	8.4	0.6	2	1	21	---	---
CV%	12.2	9.8	5.8	1	4	0.5	74.8	---	---

Table 31. Agronomic data for spring barley at Arco, irrigated, 2000.

Variety	Yield	Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
	bu/A	lb/bu	in.	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>							
Moravian 37	120.1	54.4	30	185	0	95	1
Moravian 14	120.7	56.4	25	174	0	74	3
Baronesse	118.4	55.6	30	181	13	92	1
Moravian 22	110.8	53.8	32	184	0	92	1
Idagold	101.2	53.5	25	187	0	75	3
C32	100.3	55	27	187	0	77	3
B1202	99.2	54	36	183	0	91	1
Crystal	96.5	54.8	33	186	7	88	1
Harrington	84.7	53.4	32	184	0	73	3
Average	106.5	54.6	30	183	2	83	2
LSD.10	11.8	0.9	2	2	9	---	---
CV%	10.4	1.5	5.3	0.9	366.8	---	---

Table 32. Agronomic data for spring barley at Aberdeen and Idaho Falls, combined, irrigated, 2000.

Variety	----- Yield (bu/A) -----			Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
	Aberdeen	Id. Falls	Average	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
Moravian 37	136.3	136.5	122.8	55	27	172	15	98	1
Baronesse	143	138.4	126.9	54	30	170	13	95	1
C32	132.4	139.3	123.3	53.9	27	172	3	97	0
Moravian 22	137.3	136.7	122	53	29	173	13	95	1
Idagold	135.5	134.5	121.7	53.3	26	174	5	93	1
Crystal	129.2	135.3	120.6	54.2	33	171	27	95	1
Harrington	124.9	138.9	116.9	53.7	34	169	53	90	1
Galena	132.1	135.8	116.2	53.3	29	173	7	96	1
Moravian 14	113	129.4	110.3	55	27	165	8	94	1
B1202	120.6	114.8	106	53.5	31	171	2	97	1
Average	125.1	136.6	130.9	53.9	31	170	15	95	1



Table 33. Agronomic data for spring barley at Aberdeen, irrigated, 2000.

Variety	--- Yield (bu/A) ---			Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
	1998	1999	2000	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
Moravian 37	112.8	---	136.3	55.1	28	168	13	97	1
Baronesse	106	132.4	143	54.4	30	167	23	94	1
Moravian 22	118.8	129.5	137.3	53.2	30	169	7	95	1
Idagold	135.9	142.2	135.5	53.2	28	168	10	92	1
C32	131.2	137.8	132.4	54.2	28	168	3	96	1
Galena	115.8	---	132.1	53.2	33	169	7	96	1
Crystal	80.1	112.8	129.2	54.1	36	166	33	94	1
Harrington	89.1	---	124.9	53.4	37	165	67	85	2
B1202	101.7	---	120.6	53.9	31	167	3	96	1
Moravian 14	127.7	---	113	55.4	27	160	3	93	2
Average	104.4	123.6	125.1	54	32	166	16	94	1
LSD.10	10	12.4	9.4	0.6	2	1	19	---	---
CV%	9.1	9.5	7.1	1	5	0.7	112.7	---	---

Table 34. Agronomic data for spring barley at Idaho Falls, irrigated, 2000.

Variety	---- Yield (bu/A) ----			Test Wt.	Height	Date Head	Lodging	% Plump	% Thin
	1998	1999	2000	(lb/bu)	(in.)	from Jan. 1	%	(>6/64)	(<5/64)
<b>Two-Row Spring Barley</b>									
Moravian 37	81.6	86.1	136.5	54.8	26	177	17	99	0
C32	85.3	79.2	139.3	53.6	27	177	3	98	0
Harrington	88.7	85.9	138.9	53.9	31	173	40	95	1
Baronesse	101.8	83.7	138.4	53.5	29	174	3	97	0
Moravian 22	92.9	78.6	136.7	52.8	29	177	20	96	0
Galena	87.2	80.1	135.8	53.4	26	177	7	96	0
Crystal	58.1	77.6	135.3	54.2	30	175	20	96	1
Idagold	77.2	86.2	134.5	53.3	24	181	0	95	1
Moravian 14	92.5	86	129.4	54.6	26	170	13	95	0
B1202	92.4	63.9	114.8	53	30	174	0	97	0
Average	87.4	81.3	136.6	53.7	30	174	14	96	0
LSD.10	10.1	14	11.7	0.5	2	1	19	---	---
CV%	10.9	16.3	8.1	0.9	7	0.4	127.2	---	---

Table 35. Yield, test weight, and plump data for spring barley from Kimberly, Rupert, Aberdeen, and Idaho Falls, irrigated, 1997-2000.

Variety	Avg. Yield (bu/A)		Avg. Test Wt. (lbs/bu)		Percent Plump (%)	
	97-2000	99-2000	97-2000	99-2000	97-2000	99-2000
no. of stat. yrs.	16	8	16	8	16	8
<b>Two-Row Spring Barley</b>						
Moravian 37	---	129.9	---	53.8	---	95
Baronesse	130	132.6	52.2	52.8	91	92
Moravian 14	128.6	130.1	53.5	54.2	86	88
Moravian 22	127.1	129.3	51.4	51.8	94	95
Idagold	124.5	129.3	51	51.9	87	90
Galena	122.8	127.9	52	52.6	89	90
B1202	116.4	116.6	51	52.1	92	94
Harrington	116.1	125.4	51.1	51.9	86	87
Crystal	110.2	123	52.2	52.9	89	91
C32	---	132.1	---	52.6	---	92

# 1999 SMALL GRAINS REPORT FOR SOUTHCENTRAL AND SOUTHEASTERN IDAHO

University of Idaho College of Agriculture Cooperative Extension System  
Progress Report No. 335, January, 2000

Donnie Wicker, Larry Robertson, & Katherine O'Brien  
<http://www.uidaho.edu/aberdeen/cereals/99report/99report.htm>

## Spring Barley for Southcentral & Southeastern Idaho, 1999

Table 24. Agronomic data for spring barley at Kimberly, irrigated, 1999.

Table 25. Agronomic data for spring barley at Rupert, irrigated, 1999.

Table 27. Agronomic data for spring barley at Aberdeen, irrigated, 1999.

Table 28. Agronomic data for spring barley at Ririe, irrigated, 1999.

Table 29. Agronomic data for spring barley at Ashton, irrigated, 1999.

Table 24. Agronomic data for spring barley at Kimberly, irrigated, 1999.

Å	--- Yield (bu/A) ---			Test Wt.	Height	Date Head	Lodging
Variety	1997	1998	1999	(lb/bu)	(in.)	from Jan. 1	%
<b>Two-Row Spring Barley</b>							
C37	---	101.6	132.2	54.7	28	172	2
Crystal	---	100.7	136.8	54	35	170	0
C32	---	113.7	135.2	52.4	28	172	0
Baronesse	146.5	123.8	133.7	53.3	31	167	7
Moravian 22	142.7	112.1	130.4	53	30	172	0
Moravian 14	129.7	126.9	128.4	54.4	28	160	0
Harrington	140.6	98.9	127.1	52.1	33	167	0
Galena	139.5	107	123.3	52.2	28	172	0
B1202	134.4	107.3	122	52	33	168	0
Idagold	133	95.4	121.2	51	27	175	0
Average	138.6	107.9	131.4	53.1	31	168	3
LSD.10	7.2	9.2	10.3	0.9	2	2	7
CV%	4.9	8.1	7.4	1.6	4.9	1	203.5

Table 25. Agronomic data for spring barley at Rupert, irrigated, 1999.

Å	---- Yield (bu/A) ----			Test Wt.	Height	Date Head	Lodging
Variety	1997	1998	1999	(lb/bu)	(in.)	from Jan. 1	%
<b>Two-Row Spring Barley</b>							
C37	---	113.3	136	49.2	31	178	77
Moravian 14	138.1	129.1	151.2	51.3	30	173	88
Galena	143.8	102.8	147.6	49.3	32	179	67
C32	---	119.7	145.9	48	30	177	67
Moravian 22	154.7	116	144.3	47.8	29	178	68
Idagold	141.4	98.3	137.2	47.6	27	179	72
Baronesse	165.3	106.9	130.3	47.2	31	177	93
Crystal	117.5	91.4	129.9	48.8	37	177	88
B1202	131.9	116	123	47.2	33	176	95
Average	134.1	105	131.8	48.1	33	176	89
LSD.10	10.7	13.5	13.7	1.3	2	1	11
CV%	7.5	12.2	9.8	2.6	6.6	0.5	11.5

Table 27. Agronomic data for spring barley at Aberdeen, irrigated, 1999.

Å	--- Yield (bu/A) ---			Test Wt.	Height	Date Head	Lodging
Variety	1997	1998	1999	(lb/bu)	(in.)	from Jan. 1	%
<b>Two-Row Spring Barley</b>							
C37	---	112.8	---	53.1	34	175	23
Idagold	148.7	135.9	142.2	51.6	31	177	15
C32	---	131.2	137.8	51.6	31	175	5
Baronesse	155.4	106	132.4	52.4	38	172	73
Moravian 22	133.4	118.8	129.5	48.9	36	176	7
Crystal	121.6	80.1	112.8	51.6	41	173	85
B1202	136.8	101.7	---	52	40	172	52
Galena	140.6	115.8	---	51.3	34	176	22
Harrington	132.9	89.1	---	51.2	41	174	88
Moravian 14	166.4	127.7	---	52.9	37	170	37
Average	136.2	104.4	123.6	51.4	38	172	59
LSD.10	14	10	12.4	---	2	1	17
CV%	9.7	9.1	9.5	---	5.3	0.4	27.6
Note: Yield information was lost during processing for the last 12 varieties.							

Table 28.A65 Agronomic data for spring barley at Ririe, irrigated, 1999.

Å	--- Yield (bu/A) ---			Test Wt.	Height	Date Head
Variety	1997	1998	1999	(lb/bu)	(in.)	from Jan. 1
<b>Two-Row Spring Barley</b>						
C37	---	81.6	86.1	53.7	27	190
Idagold	127.9	77.2	86.2	51.8	24	192
Moravian 14	108.5	92.5	86	54.2	24	182
Harrington	99.5	88.7	85.9	52.5	33	190
Baronesse	114.2	101.8	83.7	52.3	29	185
Galena	110	87.2	80.1	52.9	26	190
C32	---	85.3	79.2	52.5	25	189
Moravian 22	124	92.9	78.6	52	26	189
Crystal	99.4	58.1	77.6	52.1	30	188
B1202	108.9	92.4	63.9	51.9	26	189
Average	110.2	87.4	81.3	53	29	186
LSD.10	16.2	10.1	14	0.7	3	2
CV%	13.9	10.9	16.3	1.2	9.7	0.8

Table 29. Agronomic data for spring barley at Ashton, irrigated, 1999.

Å	Yield	Test Wt.	Height	Date Head	Lodging
Variety	bu/A	lb/bu	in.	from Jan. 1	%
<b>Two-Row Spring Barley</b>					
C37	104.7	54.8	26	208	2
Baronesse	117.7	53.4	28	204	20
Idagold	115.6	53.5	23	211	0
Moravian 22	114	52.9	26	209	2
Moravian 19	113.2	53.1	28	207	17
Galena	111.6	53.9	26	210	0
C32	109	53.7	24	209	0
Chinook	106.7	54	33	203	68
Moravian 14	106.6	54.6	27	198	17
Harrington	106.3	53.8	32	206	42
Crystal	103.4	54	32	209	30
Average	107.1	54.1	30	205	28
LSD.10	8.2	0.8	2	1	22
CV%	7.3	1.3	6.1	0.5	75

## COORS BREWING COMPANY

### 2000 BURLEY, IDAHO VARIETY OBSERVATION TRIAL

REP	PLOT #	Cross Parent	June Heading Date	Plant Height Inches	Plant Lodging %	Yield lbs/plot	Test Weight lbs/bu	Plump Grain % over 6/64"	Grain Moisture %	Agtron Color
1	922	C37	14	29	5	12.36	54.8	98	9.8	56
1	923	CH35-3-7	7	26	10	10.38	54.5	97	9.9	50
1	924	CHERI	13	27	0	10.92	54.9	98	9.9	52
1	925	CRYSTAL	13	31	20	11.72	54.8	96	9.9	61

Non-Replicated, Side by Side comparison Plots (4feetx13feet)

200100112

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
BELTSVILLE, MARYLAND 20705

FORM APPROVED: OMB NO. 40-R3822

EXHIBIT C  
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY  
BARLEY (HORDEUM VULGARE)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S)

Coors Brewing Company

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

12th and Ford Street, Golden, Colorado 80401

United States of America

FOR OFFICIAL USE ONLY

PVPO NUMBER

200100112

VARIETY NAME OR TEMPORARY  
DESIGNATION Moravian 37

Place the appropriate number that describes the varietal character of this variety in the boxes below.  
Place a zero in first box (i.e.    or   ) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

1 - SPRING 2 - FACULTATIVE WINTER 3 - WINTER  Early Growth: 1 - PROSTRATE 2 - SEMIPROSTRATE  
3 - ERECT

2. MATURITY (50% Flowering):

1 - EARLY (California Mariout) 2 - MIDSEASON (Betzes) 3 - LATE (Frontier)

No. of days Earlier than .....  } 1 - BETZES 2 - CALIFORNIA MARIOUT 3 - CONQUEST 4 - DICKSON  
 No. of days Later than .....  } 5 - PIROLINE 6 - PRIMUS 7 - UNITAN 8 - Galena 9 - Crystal

3. PLANT HEIGHT (From soil level to top of head):

1 - SEMIDWARF 2 - SHORT (California Mariout) 3 - MEDIUM TALL (Betzes) 4 - TALL (Conquest)

Cm. Shorter than .....  } 1 - BETZES 2 - CALIFORNIA MARIOUT 3 - CONQUEST 4 - DICKSON  
  Cm. Taller than .....  } 5 - PIROLINE 6 - PRIMUS 7 - UNITAN 8 - Galena 9 - Crystal

4. STEM:

Erection (Flag to spike at maturity): 1 - 0-3 cm. 2 - 3-10 cm.  Anthocyanin: 1 - ABSENT 2 - PRESENT  
3 - 10-15 cm.

NO. OF NODES (Originating from node above ground)

Collar Shape: 1 - CLOSED 2 - V-SHAPED 3 - OPEN  Shape of Neck: 1 - STRAIGHT 2 - SNAKY  
4 - MODIFIED CLOSED OR OPEN 3 - OTHER (Specify)

5. LEAF:

Basal leaf sheath (seedling): 1 - GLABROUS 2 - PUBESCENT  Position of flag leaf (at boot stage): 1 - DROOPING  
2 - UPRIGHT

Waxiness: 1 - ABSENT (Glossy) 2 - SLIGHTLY WAXY   MM. WIDTH (First leaf below flag leaf)  
3 - WAXY

CM. LENGTH (First leaf below flag leaf)  Anthocyanin in leaf sheath: 1 - ABSENT 2 - PRESENT

6. HEAD:

Type: 1 - TWO-ROWED 2 - SIX-ROWED  Density: 1 - LAX 2 - ERECT (Not dense)  
3 - ERECT (Dense)

Shape: 1 - TAPERING 2 - STRAP 3 - CLAVATE  Waxiness: 1 - ABSENT (Glossy) 2 - SLIGHTLY WAXY  
4 - OTHER (Specify) 3 - WAXY

Lateral Kernels Overlap: 1 - NONE 2 - AT TIP  Rachis (Hair on edge): 1 - LACKING 2 - FEW 3 - COVERED  
3 - 1/4-1/2 OF HEAD

7. GLUME:

Length: 1 - 1/3 OF LEMMA 2 - 1/2 OF LEMMA  Hairs: 1 - NONE 2 - SHORT 3 - LONG  
3 - MORE THAN 1/2 OF LEMMA

Hair covering: 1 - NONE 2 - RESTRICTED TO MIDDLE 3 - CONFINED TO BAND 4 - COMPLETELY COVERED

Awns: 1 - LESS THAN EQUAL TO LENGTH OF GLUMES 2 - EQUAL TO LENGTH OF GLUMES  
3 - MORE THAN EQUAL TO LENGTH OF GLUMES

Awn Surface: 1 - SMOOTH 2 - SEMISMOOTH 3 - ROUGH

## 8. LEMMA:

- 5 Awn: 1 - AWNLESS 2 - AWNLETS ON CENTRAL ROWS AWNLESS ON LATERAL ROWS  
 3 - SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 - SHORT (less than equal to length of spike)  
 5 - LONG (longer than spike) 6 - HOODED
- 4 Awn Surface: 1 - AWNLESS 2 - SMOOTH 3 - SEMISMOOTH 4 - ROUGH
- 3 Teeth: 1 - ABSENT 2 - FEW 3 - NUMEROUS 1 Hair: 1 - ABSENT 2 - PRESENT
- 1 Shape of base: 1 - DEPRESSION 2 - SLIGHT CREASE 2 Rachilla Hairs: 1 - SHORT 2 - LONG  
 3 - TRANSVERSE CREASE

## 9. STIGMA:

- 2 Hairs: 1 - FEW 2 - MANY

## 10. SEED:

- 2 Type: 1 - NAKED 2 - COVERED 1 Hairs on Ventral Furrow: 1 - ABSENT 2 - PRESENT
- 3 Length: 1 - SHORT (8.0 mm.) 2 - SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 - MIDLONG (8.5 - 9.5 mm.)  
 4 - MIDLONG TO LONG (9.0 - 10.5 mm.) 5 - LONG (10.0 mm.)
- 4 Wrinkling of hull: 1 - NAKED 2 - SLIGHTLY WRINKLED 3 - SEMIWRINKLED 4 - WRINKLED
- 1 Aleurone Color: 1 - COLORLESS (White or Yellow) 2 - BLUE
- 0 0 PERCENT ABORTIVE 4 4 GMS. PER 1000 SEEDS

## 11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- 0 SEPTORIA 1 NET BLOTCH 1 SPOT BLOTCH 0 POWDERY MILDEW
- 1 LOOSE SMUT 1 BACTERIAL BLIGHT 1 COVERED SMUT 0 FALSE LOOSE SMUT
- 1 STEM RUST 1 LEAF RUST 0 SCAB 0 SCALD
- 0 AY 0 BSMV 0 BYDV 0 OTHER (Specify)

## 12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

- 0 GREEN BUG 0 ENGLISH GRAIN APHID. 0 CHINCH BUG 0 ARMYWORM
- 0 GRASS HOPPERS 0 CERIAL LEAF BETTLE 0 OTHER (Specify)
- HESSIAN FLY RACES } GP A B C  
 D E F G

## 13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

- 0 DDT 0 OTHER (Specify)

## 14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Cheri	Seed size	Cheri
Leaf size	Galena	Coleoptile elongation	Galena
Leaf color	Galena	Seedling pigmentation	Galena
Leaf carriage	Cheri		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

- Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
- Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
- Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE**EXHIBIT E**  
**STATEMENT OF THE BASIS OF OWNERSHIP**

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). The information is held confidential until the certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)  Coors Brewing Company	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER  C37	3. VARIETY NAME  Moravian 37
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP, and Country)  12th and Ford Street Golden, Colorado 80401 United States of America	5. TELEPHONE (Include area code)  (303) 279-6565	6. FAX (Include area code)  (303) 277-6426
7. PVPO NUMBER  Not Yet Assigned		120010011
8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. If no, please explain. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? If no, give name of country. ☒ YES ☐ NO10. Is the applicant the original owner? ☒ YES ☐ NO If no, please answer one of the following:

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?

☐ YES ☐ NO If no, give name of country

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?

☐ YES ☐ NO If no, give name of country

11. Additional explanation on ownership (If needed, use the reverse for extra space):

All of the specific individuals listed above in Exhibit A (e.g. Berry J. Treat, David J. Gebhardt, Kathy R. Adams, Roy J. Hanson, James M. Jakicic, and Dennis J. Dolan) were employed by Applicant (Coors Brewing Company) during development, production, testing, and/or completion of barley variety Moravian 37 (originally designated with temporary/experimental number C37 as noted above). By contract with its employees, Applicant (Coors Brewing Company) is the exclusive owner of the present application and all subject matter therein including but not limited to exclusive rights in and to barley variety Moravian 37 as described herein.

**PLEASE NOTE:**

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 6 minutes per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. (Not all prohibited bases apply to all programs). Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.